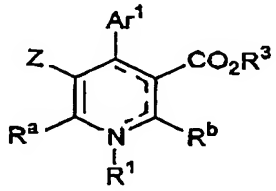
CLAIMS

1. A T-type calcium channel blocker that is a compound of formula (1), a pharmaceutically acceptable salt thereof or a solvate thereof:



(1)

wherein

Ar^1 is phenyl group, pyridyl group, furyl group or 2,1,3-benzoxadiazol-4-yl group (the phenyl group, pyridyl group, furyl group and 2,1,3-benzoxadiazol-4-yl group may be arbitrarily substituted with one or two substituents selected from NO_2, CF_3, Br, Cl, F, C_{1-20}alkyl group, OH, OR^6, $OCHF_2$, $COOR^6$, NH_2, NHR^6, NR^6R^7, $CONH_2$, $CONHR^6$, $CONR^6R^7$, $COSR^6$, SR^6, $S(O)R^6$, $S(O)_2R^6$, SO_3H, SO_3R^6, SO_2NH_2, SO_2NHR^6, $SO_2NR^6R^7$, CN and phenyloxy group, wherein R^6 and R^7 are independently of each other C_{1-6}alkyl group;

nitrogen-containing hetero ring moiety is 1,4-dihydropyridine ring or pyridine ring;

Z is a group of formula (2)

(2)

wherein R^4 and R^5 are independently of each other OH, C_{1-6}alkoxy group, C_{3-6}alkenyloxy group, C_{3-6}alkynyloxy group, OAr^2, $OANR^6R^7$, $OAN(CH_2Ar^2)R^6$, $OAOR^6$, OACN, NH_2, NHR^6, NR^6R^7, 1-pyperidinyl group or 1-pyrrolidinyl group, or

R^4 and R^5 together are OYO, NHYO, R^6NYO, NHYNH, R^6NYNH or R^6NYNR^7 wherein R^6 and R^7 are as defined above,

Ar^2 is phenyl group (the phenyl group may be arbitrarily substituted with halogen atom, C_{1-3}alkyl group or C_{1-3}alkoxy group),

A is C_{2-6}alkylene group (the C_{2-6}alkylene group may be arbitrarily substituted with C_{1-3}alkyl group or Ar^2), and

Y is straight-chain C_{2-4}alkylene group (the C_{2-4}alkylene group may be arbitrarily substituted with C_{1-6}alkyl group, C_{1-6}alkoxy group, C_{1-6}alkoxycarbonyl group or Ar^2), or

Z is CO_2R^2, wherein R^2 is C_{1-6}alkyl group (the C_{1-6}alkyl group may be arbitrarily substituted with C_{1-3}alkoxy group);

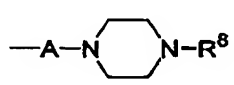
R^a and R^b are independently of each other C_{1-6}alkyl group, ANR^8R^9, $CH_2OANR^8R^9$, Ar^2,

$CH=CHAr^2$, $CH_2CH(OH)Ar^2$, CHO, CN, CH_2OH, CH_2OR^8, $AN(CH_2CH_2)_2NR^8$ or NR^8R^9, wherein R^8 and R^9 are independently of each other hydrogen atom, C_{1-6}alkyl group (the C_{1-6}alkyl group may be arbitrarily substituted with phenyl group, wherein the phenyl group may be arbitrarily substituted with C_{1-6}alkoxy group or halogen atom) or phenyl group (the phenyl group may be arbitrarily substituted with C_{1-6}alkoxy group or halogen atom),

Ar^2 and A are as defined above;

in case where the nitrogen-containing hetero ring moiety is 1,4-dihydropyridine ring, R^1 is C_{1-6}alkyl group, ANR^8R^9, $AN(CH_2CH_2)_2NR^8$, $AN(CH_2CH_2)_2O$, AOR^8 or benzyl group, wherein R^8, R^9 and A are as defined above; and

R^3 is hydrogen atom, C_{1-20}alkyl group, C_{2-6}alkenyl group or C_{2-6}alkynyl group (C_{1-20}alkyl group, C_{2-6}alkenyl group and C_{2-6}alkynyl group may be arbitrarily substituted with phenyl group, wherein the phenyl group may be arbitrarily substituted with C_{1-6}alkoxy group or halogen atom), ANR^8R^9 or a group of formula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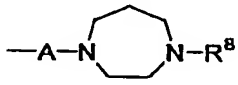
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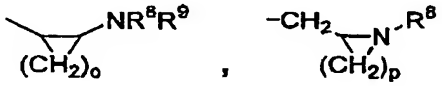
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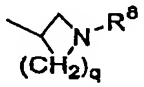
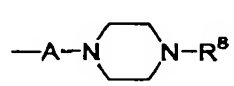


wherein R^8, R^9 and A are as defined above,

o and p are independently of each other 3 or 4, and

q is 1, 2 or 3.

2. The T-type calcium channel blocker according to claim 1, wherein R^3 is ANR^8R^9 or a group of formula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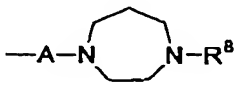
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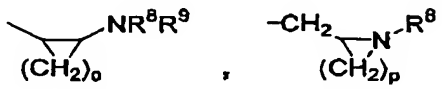
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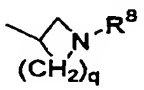

wherein R^8, R^9, A, o, q and p are as defined above; and

R^5 is C_{1-6}alkyl group.

3. The T-type calcium channel blocker according to claim 2, wherein R^b is C_{1-6}alkyl group, CN or NH_2.

4. The T-type calcium channel blocker according to claim 1, wherein R^b is ANR^8R^9, $CH_2OANR^8R^9$ or $CH_2CH_2N(CH_2CH_2)_2NR^8$, wherein
A, R^8 and R^9 are as defined above;
R^3 is C_{1-20}alkyl group, C_{2-6}alkenyl group or C_{2-6}alkynyl group (C_{1-20}alkyl group, C_{2-6}alkenyl group and C_{2-6}alkynyl group may be arbitrarily substituted with phenyl group, wherein the phenyl group may be arbitrarily substituted with C_{1-6}alkoxy group or halogen atom); and
R^5 is C_{1-6}alkyl group.

5. The T-type calcium channel blocker according to any one of claims 1 to 4, wherein the nitrogen-containing hetero ring moiety is 1,4-dihydropyridine ring; and
Z is a group of formula (2).

6. The T-type calcium channel blocker according to claim 5, wherein R^4 and R^5 together are OYO, NHYO, R^6NYO, NHYNH, R^6NYNH or R^6NYNR^7, wherein
Y is straight-chain C_{2-4}alkylene group (the C_{2-4}alkylene group may be substituted with C_{1-6}alkyl group, C_{1-6}alkoxy group, C_{1-6}alkoxycarbonyl group or Ar^2).

7. The T-type calcium channel blocker according to claim 6, wherein Ar^1 is phenyl group, 3-nitrophenyl group, 2-nitrophenyl group, 3-chlorophenyl group, 2-chlorophenyl group, 3-methoxyphenyl group, 2-methoxyphenyl group, 2-trifluoromethylphenyl group, 3-trifluoromethylphenyl group, 4-pyridyl group, 3-pyridyl group, 2-pyridyl group or 2,3-dichlorophenyl group.

8. The T-type calcium channel blocker according to any one of claims 1 to 4, wherein the nitrogen-containing hetero ring moiety is pyridine ring; and
Z is a group of formula (2).

9. The T-type calcium channel blocker according to claim 8, wherein R^4 and R^5 together are OYO, NHYO, R^6NYO, NHYNH, R^6NYNH or R^6NYNR^7, wherein
Y is straight-chain C_{2-4}alkylene group (the C_{2-4}alkylene group may be arbitrarily substituted with C_{1-6}alkyl group, C_{1-6}alkoxy group, C_{1-6}alkoxycarbonyl group or Ar^2).

10. The T-type calcium channel blocker according to claim 9, wherein Ar^1 is phenyl group, 3-nitrophenyl group, 2-nitrophenyl group, 3-chlorophenyl group, 2-chlorophenyl group, 3-methoxyphenyl group, 2-methoxyphenyl group, 2-trifluoromethylphenyl group, 3-trifluoromethylphenyl group, 4-pyridyl group, 3-pyridyl group, 2-pyridyl group or 2,3-dichlorophenyl group.

11. The T-type calcium channel blocker according to any one of claims 1 to 4, wherein the nitrogen-containing hetero ring moiety is 1,4-dihydropyridine ring; and
Z is CO_2R^2.

12. The T-type calcium channel blocker according to claim 11, wherein Ar^1 is phenyl group, 3-nitrophenyl group, 2-nitrophenyl group, 3-chlorophenyl group, 2-chlorophenyl group, 3-methoxyphenyl group, 2-methoxyphenyl group, 2-trifluoromethylphenyl group, 3-trifluoromethylphenyl group, 4-pyridyl group, 3-pyridyl group, 2-pyridyl group or 2,3-dichlorophenyl group.

13. The T-type calcium channel blocker according to any one of claims 1 to 4, wherein the nitrogen-containing hetero ring moiety is pyridine ring; and
Z is CO_2R^2.

14. The T-type calcium channel blocker according to claim 13, wherein Ar^1 is phenyl group, 3-nitrophenyl group, 2-nitrophenyl group, 3-chlorophenyl group, 2-chlorophenyl group, 3-methoxyphenyl group, 2-methoxyphenyl group, 2-trifluoromethylphenyl group, 3-trifluoromethylphenyl group, 4-pyridyl group, 3-pyridyl group, 2-pyridyl group or 2,3-dichlorophenyl group.

15. A pharmaceutical containing the T-type calcium channel blocker according to claim 1.

16. The pharmaceutical according to claim 15, wherein the pharmaceutical is a therapeutic or preventive agent against a disease for which T-type calcium channel blocking action is effective.

17. The pharmaceutical according to claim 16, wherein the disease is hypercardia,

heart failure, cardiomyopathy, atrial fibrillation, tachyarrhythmia, arterial sclerosis, nephritis, nephropathy, renal disorder, renal insufficiency, inflammation, edema, hyper-aldosteronism, neurogenic pain, epilepsy or cancer.

18. A method for preventing or treating hypercardia, heart failure, cardiomyopathy, atrial fibrillation, tachyarrhythmia, arterial sclerosis, nephritis, nephropathy, renal disorder, renal insufficiency, inflammation, edema, hyper-aldosteronism, neurogenic pain, epilepsy or cancer, comprising administering an effective amount of the compound of formula (1), a pharmaceutically acceptable salt thereof or a solvate thereof according to claim 1.

19. Use of the compound of formula (1), a pharmaceutically acceptable salt thereof or a solvate thereof according to claim 1 for the manufacture of a preventive agent or a therapeutic agent for hypercardia, heart failure, cardiomyopathy, atrial fibrillation, tachyarrhythmia, arterial sclerosis, nephritis, nephropathy, renal disorder, renal insufficiency, inflammation, edema, hyper-aldosteronism, neurogenic pain, epilepsy or cancer.